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Paper No. 46

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte C. STEVEN MCDANIEL, FRANK M. RAUSHEL
and JAMES R. WILD

Appeal No. 1997-2138
Application No. 08/252,384

ON BRIEF

Before STONER, Chief Administrative Patent Judge,¹ and WINTERS and ADAMS,
Administrative Patent Judges.

WINTERS, Administrative Patent Judge.

ON REMAND FROM THE U. S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PROCEDURAL BACKGROUND

The subject matter of this appeal was previously before the board. See Paper No. 40, where another merits panel affirmed the examiner's rejections of claims 53 through 64 as unpatentable under 35 U.S.C. §§ 102(a) and 102(b). That decision, in

¹ Administrative Patent Judge Robinson authored the original board opinion in this case. Ex parte McDaniel, No. 1997-2138 (BPAI January 8, 2001). Judge Robinson subsequently retired from federal service, and has been replaced on this merits panel with Chief Administrative Patent Judge Stoner.

turn, was subject to court review. See Paper No. 45, where the Federal Circuit affirmed the board's determination that claims 53, 54 and 58 through 64 are unpatentable on prior art grounds. The court vacated the board's disposition of claims 55 through 57, stating that "[o]n remand, the Board should select one of Claims 55-57 and decide the appeal as to the § 103 rejection of Claims 55-57 on the basis of the selected claim" (Paper No. 45 section B III, last sentence).

THE INVENTION

Applicants' invention relates to a method for detoxifying an organophosphorus compound by exposing the compound to recombinant bacterial organophosphorus acid anhydrase. Simply stated, the step of exposing a toxic organophosphorus compound to a specific, recombinant enzyme detoxifies the compound and renders it harmless.

Organophosphorus neurotoxins may be found in agricultural and domestic pesticides, as well as nerve gases in chemical warfare arsenals. Because of increased usage of such compounds in modern society, numerous environmental problems have arisen. The main problem is a lack of safe and efficient means of disposal of these compounds, a problem known in the art at the time applicants' invention was made.

See the instant specification, pages 2 and 3; and Paper No. 27, pages 5 and 6.

Applicants seek to address the problem by providing a safe method for detoxifying organophosphorus compounds using a recombinant bacterial organophosphorus acid anhydrase.

Specifically, bacteria are transformed with an expression vector containing an organophosphorus detoxifying gene (opd) to produce a recombinant bacterial

organophosphorus acid anhydrase. The recombinant anhydrase may then be used to detoxify organophosphorus compounds.

Independent claim 53, which was the focus of attention in the previous board and court decisions, reads as follows:

53. A method for detoxifying an organophosphorus compound comprising exposing said compound to recombinant bacterial organophosphorus acid anhydrase.

Returning now to the court's instruction on remand (Paper No. 45, section B III, last sentence), we here select dependent claim 57 as representative of claims 55 through 57. Respecting the rejection of claims 55 through 57 under 35 U.S.C. § 103, we shall decide this appeal on the basis of the selected claim. Accordingly, for the purposes of this appeal, claims 55 and 56 shall stand or fall together with claim 57 which reads as follows:

57. The method of claim 53 wherein said organophosphorus compound is in air.

THE REJECTION OF CLAIMS 55 THROUGH 57

In the Examiner's Answer (Paper No. 32), pages 24 and 25, claims 55 through 57 stand rejected "under 35 U. S. C. 103 as being unpatentable over Munnecke (AW) taken with Munnecke (CD), McDaniel et al. (BY) and Gottlieb (US '959); or, under 35 U.S.C. 103 as being unpatentable over Munnecke (AW) taken with Munnecke (CD), and Wild et al. (AT) and Gottlieb (US '959) as applied to claims 53-54 and 59-64 above, and further in view of Grot et al. (US '650)." The rejections under 35 U.S.C. § 103 "applied

to claims 53-54 and 59-64 above" are set forth in the Answer, pages 22 through 24. A listing of references relied on in rejecting these claims may be found in the Examiner's Answer, section (9), and in the previous board opinion (Paper No. 40, page 2).

DISCUSSION

On consideration of the record, we agree that the subject matter sought to be patented in claim 57 would have been obvious to a person having ordinary skill in the art at the time the invention was made. Essentially, we agree with the reasoning set forth in the Examiner's Answer, pages 24 and 25. We shall therefore adopt that reasoning as our own, adding the following comments for emphasis.

In the opinion accompanying its judgment in this case, the court held that the board's affirmance of the examiner's final rejection of claim 53 was correct. According to the court, the board's determination that McDaniel (BY), Harper, Wild and McDaniel (AZ) each describes "the use of a recombinant bacterial organophosphorus acid anhydase for the detoxification of an organophosphorus compound" was supported by substantial evidence (Paper No. 45, section V). As stated by the court, "each reference plainly discloses the use of such an enzyme in this way" (*id.*).

It follows from the "law of the case" that McDaniel (BY) and Wild each describes the method recited in claim 53 within the meaning of 35 U.S.C. § 102. We focus on McDaniel (BY) and Wild because those references were also relied on in rejecting claim 57 under 35 U.S.C. § 103 (Examiner's Answer, Paper No. 32, page 24, lines 24 through 27). Considering now that claim 57 depends from claim 53, and adds the limitation "wherein said organophosphorus compound is in air," we find that McDaniel (BY) and

Wild each discloses every feature of claim 57 except that limitation. McDaniel (BY) and Wild do not disclose that the organophosphorus compound is in air.

Gottlieb discloses a protective material for protecting persons and objects against chemical warfare agents, e.g., nerve gases and biological agents, including toxins (column 1, lines 5 through 10). The material is "profoundly processed," e.g., impregnated, with a substance capable of decomposing and decontaminating chemical and biological warfare agents (column 1, lines 40 through 45). That substance may be, or contain, an enzyme, e.g., phosphoryl phosphatase (column 1, line 62 through column 2, line 2). According to Gottlieb,

It has ... been found that certain substances, in particular enzyme containing compositions or compositions based on enzymes, in particular phosphoryl phosphatases or other bond breaking enzyme compositions and/or compositions of the ortho-iodosobenzoic acid type are able to catalyze the hydrolytic decomposition and detoxification of chemical agents in the form of nerve gases, e.g. of the organo phosphor type which in chemical respect is to be regarded as phosphoric esters, and are able to oxidize biological agents, including also toxins, and chemical agents, including H-gases and V-gases. If agents of the type mentioned above hit a target protected by the material according to the invention they are to a large extent neutralized before diffusing through the material [column 2, lines 3 through 17].

and

With a view also to obtain protection against chemical/biological agents, including blister gases and nerve gases, on a volatile or thickened form, and microorganisms and toxins, the mat is treated with substances capable of counteracting such agents, in the present case an enzyme containing composition, e.g. a phosphoryl phosphatase, and/or compositions of the orthoiodosobenzoic acid type. Such compositions have in fact proved to be able to decompose chemical agents, in particular organophosphorus compounds, such as phosphoric esters as they catalyze the hydrolytic decomposition and oxidize chemical and biological agents, respectively, thereby considerably accelerating the detoxication of such agents [column 3, lines 27 through 40].

We find that Gottlieb discloses a method for detoxifying an organophosphorus compound "in air" (e.g., gas) by exposing said compound to enzyme containing compositions or compositions based on enzymes, e.g., phosphoryl phosphatases. Gottlieb does not disclose recombinant bacterial organophosphorus acid anhydase.

In view of the combined disclosures of McDaniel (BY) and Gottlieb, or Wild and Gottlieb, we conclude that the subject matter sought to be patented in claim 57 would have been obvious within the meaning of 35 U.S.C. § 103. In our judgment, it would have been obvious to use the recombinant bacterial organophosphorus acid anhydase of McDaniel (BY) or Wild as the substance capable of decomposing and decontaminating chemical and biological warfare agents in the method disclosed by Gottlieb. In view of the combined disclosures of references, it would have been obvious to carry out a method for detoxifying an organophosphorus compound in air (Gottlieb) by exposing said compound to recombinant bacterial organophosphorus acid anhydase (McDaniel (BY) or Wild).

In their brief before this board (Paper No. 27), applicants "argued patentability generally, without setting forth separate reasons for patentability with respect to any one or more claims apart from the others" (Paper No. 45, section B II). Applicants did not lodge a separate argument, or rely on objective evidence of non-obviousness with respect to claim 57. Applicants did not argue the merits of claim 57, before us, with a reasonable degree of specificity.

Accordingly, for the reasons stated by the examiner, amplified above, we affirm the rejection of claim 57 under 35 U.S.C. § 103. As previously indicated, claims 55 and 56 fall together with claim 57. See 37 CFR § 1.192(c)(7).

The examiner's decision rejecting claims 55 through 57 under 35 U.S.C. § 103 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

Bruce H. Stoner, Jr., Chief
Administrative Patent Judge

Sherman D. Winters
Administrative Patent Judge

Donald E. Adams
Administrative Patent Judge

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Appeal No. 1997-2138
Application No. 08/252,384

Page 8

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